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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Application of:

EDMONDS

Application Serial No.: 10/692,791

Attorney Docket No.: 1232.001

Filed: October 27, 2003

Title: LIGHT CHANNELLING WINDOW PANEL FOR SHADING AND  
ILLUMINATING ROOMS

**SUBMISSION OF PRIORITY DOCUMENT**

Commissioner for Patents  
Washington, D.C. 20231

February 5, 2004

Sir:

Applicant hereby submits certified copies of Australian Patent Application Nos.  
2003901700 filed April 10, 2003 and 2003204904 filed June 25, 2003.

Respectfully submitted,

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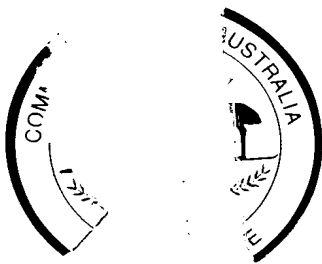
**Patent Office  
Canberra**

I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003901700 for a patent by IAN ROBERT EDMONDS as filed on 10 April 2003.

WITNESS my hand this  
Seventh day of November 2003

A handwritten signature in cursive script, appearing to read "J. Peisker".

JANENE PEISKER  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES



A method for producing a light channelling window panel for the combined shading and daylighting of rooms.

Glass windows are the conventional means for illuminating rooms with natural daylight. However, ordinary windows have some disadvantages in respect to natural illumination of rooms. One disadvantage is that natural light does not penetrate very deeply into rooms from ordinary windows. The illumination provided through ordinary windows tends to fall almost exponentially with distance from the window. A second disadvantage of ordinary windows is that direct sunlight entering through the windows will produce areas of very intense illumination in areas close to the window that give rise to thermal discomfort and reflected glare.

Thus, an objective of this invention is a method for producing a thin panel suited for installation in a window that channels or redirects all, or a very high proportion of, the sunlight incident from the sky onto a window, into an upwards direction and over the ceiling of the room being illuminated by the window. This channelling or redirection of all incident sunlight into an upwards direction providing for complete shading from incident sunlight of areas of the room in the vicinity of the window which would otherwise receive intense direct sunlight.

The general method of this invention is to produce light channels within a panel by making a series of parallel laser cuts in both sides of a single sheet of clear acrylic plastic so as to form an array of light channels in said single sheet or by making cuts through one side of a first sheet of transparent acrylic plastic and through one side of a second sheet then transposing said second sheet relative to said first sheet and fixing said transposed second sheet to said first sheet to form a combined panel containing an array of light channels.

A first preferred method of producing a light channelling panel of this invention is as follows:

(1) By use of a laser cutting machine make a parallel array of equally spaced, thin laser cuts through, or partly through, a first sheet of transparent acrylic plastic with a laser cutting machine, the cuts to be made through, or partly through the sheet at a specified spacing and at a constant small angle from the normal to the panel so as to produce an

array of laser cuts in the panel as shown in cross section in Fig 1 for cuts right through the panel and as shown in cross section in Fig 2 for cuts partly through the panel. When the laser cuts extent right through the sheet as in Fig 1 borders and thin internal regions of the sheet are left uncut and solid to support the cut regions.

(2) Make a parallel array of equally spaced, thin laser cuts through, or partly through, a second sheet of transparent acrylic plastic with a laser cutting machine, the cuts to be made through, or partly through the sheet at a the same specified spacing as the cuts made in said first sheet and at a constant small angle from the normal to the panel so as to produce an array of laser cuts in the panel as shown in cross section in Fig 1 for cuts right through the panel and as shown in cross section in Fig 2 for cuts partly through the panel. The constant small angle from the normal of the cuts made in said second sheet may be equal to or different from the small angle from the normal of the cuts in said first sheet.

(3) Transpose (that is, rotate through  $180^\circ$ , or flip), said second sheet and fix the surface of said transposed second sheet in contact with the face of said first sheet such that the edge of the cuts in said second sheet are collinear with edge of the cuts in said first sheet so as to form a combined panel containing an array of light channels as illustrated in Fig 3 for cuts right through the panels and in Fig 4 for cuts partly through the panel

A second preferred method of producing a light channelling panel of this invention is as follows:

(1) Make a parallel array of equally spaced, thin laser cuts partly through the first face of a sheet of transparent acrylic plastic with a laser cutting machine, the cuts to be partly through the sheet at a specified spacing and at a constant small angle from the normal to the panel so as to produce an array of laser cuts in the panel as shown in cross section in Fig 5.

(2) Transpose, (that is, rotate through  $180^\circ$  or flip), said sheet of transparent acrylic plastic and by use of the laser cutting machine make a second parallel array of equally spaced, thin laser cuts partly through the second face of said sheet of transparent acrylic plastic with a laser cutting machine, the cuts to be made at the same specified spacing as the cuts made in said first face and at the same or a different constant small angle from the normal to the panel so as to

produce an array of laser cuts through the second face which just meet the bottom of the cuts made through the first face so as to produce an array of light channels in said sheet as illustrated in Fig 6 suited for the channelling of light from said first surface through to said second surface. As the laser cuts meet in the middle of the sheet it is necessary to leave borders and thin internal regions uncut and solid to support the cut regions as illustrated in Fig 7.

A light channelling window panel as produced by the methods of this invention and fixed in vertical orientation in a window opening to a room will channel all, or substantially all, light from the sky incident on the first face of said panel by the process of refraction and total internal reflection through to the second face of said panel so that the light emerging from said second face is directed upward into the room as illustrated by the ray tracing of light rays in Fig 8.

Ian Robert Edmonds

Tenth of April 2003

A handwritten signature in black ink, appearing to be 'IRE', with a long horizontal line extending to the right and a diagonal line crossing through the signature.

Fig 1

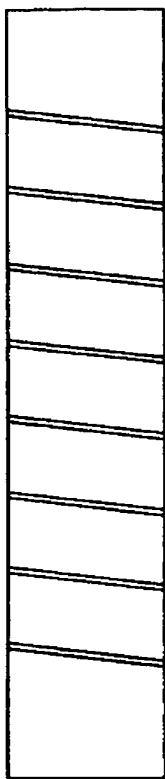


Fig 2

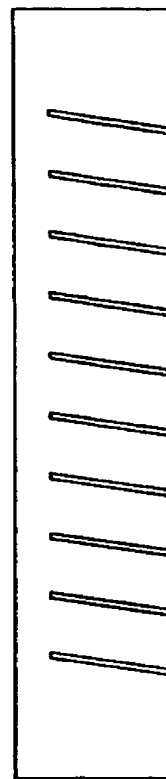


Fig 3

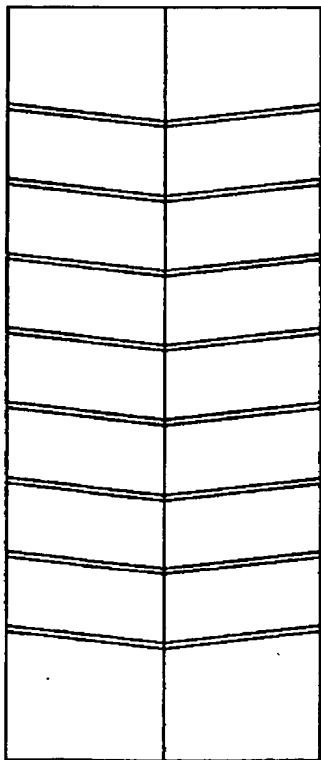
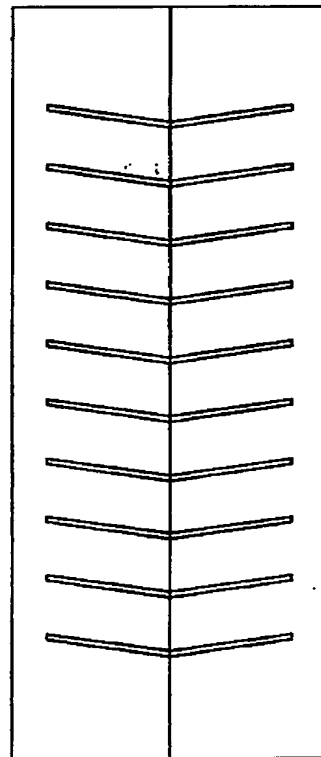


Fig 4



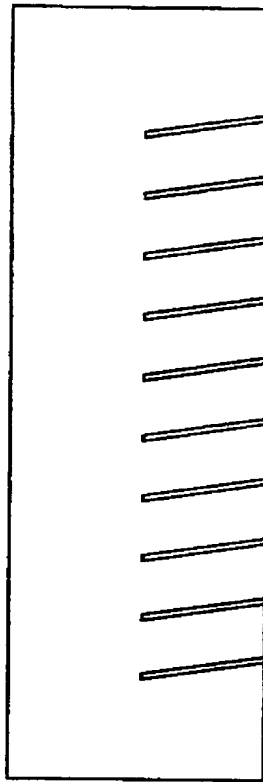


Fig 5.

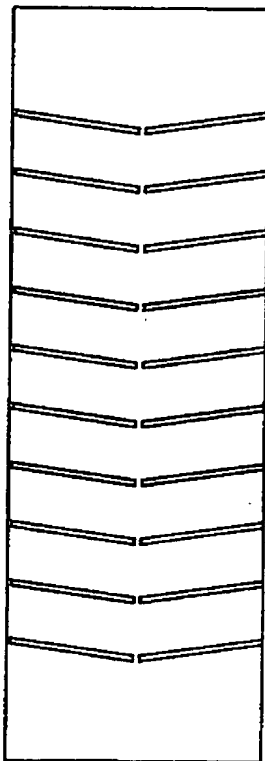


Fig 6



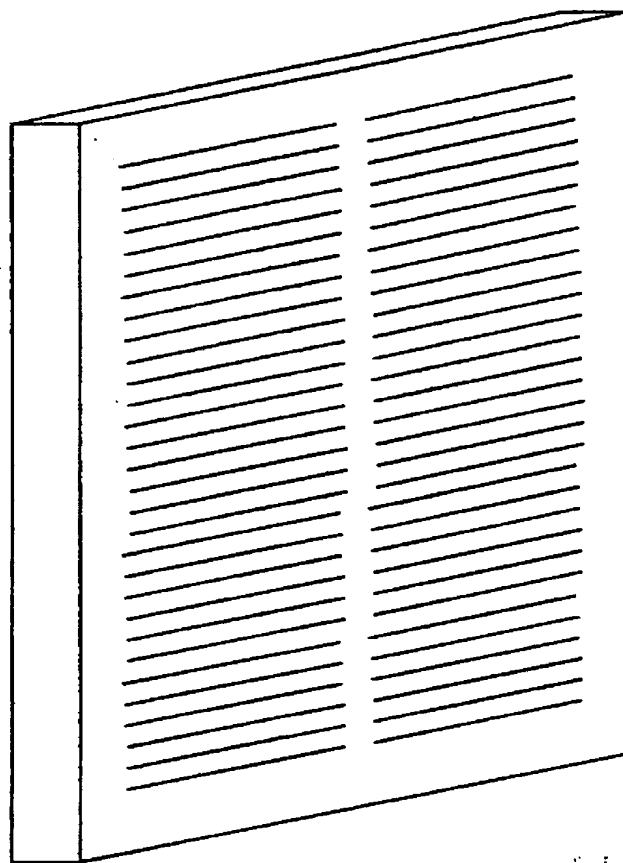


Fig 7

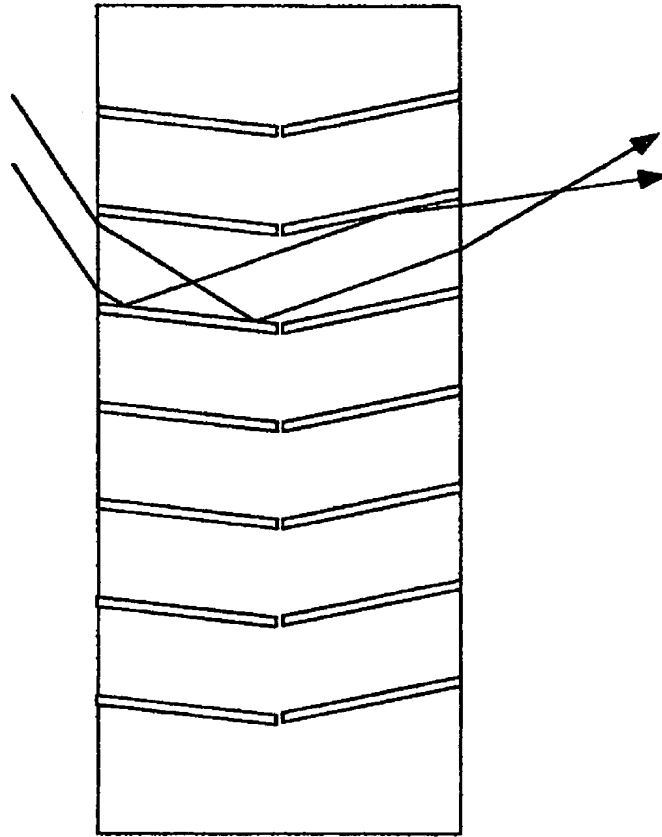


Fig 8